

THE BIRDS OF RANGANATHITTU¹

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(With two plates)

INTRODUCTION

Ranganathittu Bird Sanctuary, near Mysore, is a well-known heronry of south India where fourteen species breed from May to November on the islets of the Kaveri river. These are: Openbill stork (*Anastomus oscitans*), Eastern Large Egret (*Egretta alba*), Smaller or Median Egret (*Egretta intermedia*), Little Egret (*Egretta garzetta*), Cattle Egret (*Bubulcus ibis*), White Ibis (*Threskiornis melanocephala*), Spoonbill (*Platalea leucorodia*), Darter or Snake-bird (*Anhinga rufa*), Large Cormorant (*Phalacrocorax carbo*), Indian Shag (*Phalacrocorax fuscicollis*), Little Cormorant (*Phalacrocorax niger*), Night Heron (*Nycticorax nycticorax*), Indian Pond Heron or Paddy bird (*Ardeola grayii*), and Eastern Purple Heron (*Ardea purpurea*).

From November onwards other birds like the Great Stone Plover (*Esacus magnirostris*), the Indian River Tern (*Sterna aurantia*), the Indian Cliff Swallow (*Hirundo fluviicola*) and the Streaked Weaver Bird (*Ploceus manyar*) breed. In addition the Lesser Whistling Teal (*Dendrocygna javanica*), the Pied Kingfisher (*Ceryle rudis*), the Whitenecked Stork (*Ciconia episcopus*), the Large Pied Wagtail (*Motacilla maderaspatensis*), the Osprey (*Pandion haliaetus*), and the Redwattled Lapwing

(*Vanellus indicus*) and a variety of other birds are also seen, some throughout the year, on the vegetation growing along the banks of the river.

History. At Ranganathittu there is an ancient weir across the Kaveri river to impound the waters and convey through an aqueduct to Srirangapatna, a historical and ancient island-town nearby. The weir and the aqueduct were constructed between 1645-1648 A.D. during the reign of Sri Kanthirava Narasaraaj, a king of Mysore, to perpetuate the name of his favourite consort "Doddajamma". The weir impounded water to form a large and deep reservoir and has a number of islets. When exactly the birds started breeding here is of course not recorded.

The islets were legally constituted as a bird sanctuary in 1940 at the suggestion of Sálím Ali, during his survey of the birds of Mysore.

Nesting vegetation. There are 5-6 small islets in the impounded waters of the Kaveri river. These islets are insulated by deep waters 20-30 ft deep and bear some riverine vegetation, on which the birds nest. The main nesting trees are *Terminalia arjuna*, *Pongamia glabra*, *Salix* sp., *Vitex* sp., *Ficus* sp., *Pandanus* and *Caesalpinia bonducella* tangles and rushes; and even sedges form the nesting vegetation at Ranganathittu.

The sanctuary is surrounded by irrigated agricultural lands, which provide the feeding grounds for the nesting birds.

Arrival and Breeding. The arrival timings of the nesting birds at Ranganathittu varies from

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year to year. Naturally the birds do not settle down to breed unless the food is assured to them, which at Ranganathittu, depends upon the release of the K.R.S. Dam waters by which the agricultural fields are flooded and prepared for planting the paddy seedlings. The commencement of the rainy season, after a long dry spell of the summer, decides the commencement of the breeding season of the heronry birds. Even then the arrival and breeding timings of the various species of the birds are not the same. Some birds like the Openbill Storks arrive earlier in the breeding season and some like the Spoonbills come later. The Table gives the arrival timings of some of the birds that breed at this Sanctuary.

Predation. Crows (both *Corvus macrorhynchos* and *C. splendens*) cause heavy damage to the eggs and nestlings of the breeding birds. At Ranganathittu boats and coracles take visitors around the islets for seeing the heronry. When the boats and coracles go very near, the breeding birds get frightened and fly away leaving their nests unprotected. The crows anticipating this situation follow the boats and pillage the eggs and even take away the nestlings from the unguarded nests.

The Brahminy Kite (*Haliastur indus*) is also sometimes seen taking away the nestlings, but not the eggs.

During the breeding season the Bonnet macaques (*Macaca radiata*) in troops swim across the river to the islets and plunder the eggs from the nests. The Bonnet monkeys cause heavy damage to the birds. The tourists going close to the islets in the boats aggravate the situation as the birds leave their nests unprotected against the monkey damage. The birds ineffectively jab at the monkeys, which simply ignore this protest and pillage and feed on the eggs. When the river is in flood

ARRIVAL TIMINGS OF BIRDS TO RANGANATHITTU FOR BREEDING FROM 1972 TO 1977

Species	YEARS					
	1972	1973	1974	1975	1976	1977
Openbill Stork	May, 3rd week	Not recorded	June, 1st week	Middle of June	May, 3rd week	June, 2nd week
Large Egret	May, 3rd week	May 3rd week	June, 3rd week	June, 1st week	June, 2nd week	June, 1st week
Median Egret	Not recorded	Not recorded	May, 4th week	June, 1st week	June, 1st week	June, 3rd week
Little Egret	May, 3rd week	Not recorded	May, 4th week	June, 1st week	June, 1st week	June, 3rd week
Cattle Egret	May, 3rd week	Not recorded	June, 4th week	June, 1st week	June, 1st week	June, 3rd week
White Ibis	June, 1st week	Not recorded	July, 1st week	June, 2nd week	June, 4th week	June, 3rd week
Spoonbill	June, 4th week	Not recorded	July, 1st week	July, 1st week	July, 4th week	July, 1st week

the monkey damage is averted as the macaques cannot swim in the turbulent river. The climax of the egg laying period takes place when the river is in spate, which prevents damage from monkeys to a great extent.

Floods. Within about ten miles upstream of the Sanctuary a big dam known as K.R.S. dam occurs across the Kaveri River. The impounded waters are, from time to time, released for irrigation. This sudden release of waters causes heavy damage to the breeding birds by washing away the low built nests and the nesting vegetation. Sometimes even some portions of the islets are washed away.

When the birds arrive for breeding in the months of May and June the water level of the river is low. The birds build their nests on all the vegetation including the low vegetation. In the months of late July, August and early September there will be floods due to release of waters from the upstream reservoir, which wash away all the low built nests.

Median, Little and Cattle Egrets and the Night and Pond Herons are much affected by the floods, as they nest at lower levels. Openbill storks, White Ibis, Cormorants and Darter are not much affected by the floods, as they nest above the flood level.

Inter and intra specific relationships. The birds nest in their own separate colonies, occupying the same niches year after year. This tendency for segregation and sticking to almost permanent niches for nesting naturally avoids to a great extent interspecific competition amongst various species, although some competition cannot be ruled out at the fringes.

As the birds nest in segregated colonies, with closely packed nests, intra-specific competitions and fights do take place to some extent, although the birds are by and large not aggressive.

Departure and migration. By end of October the water flow in the river is much reduced. Release of water into the canals is also stopped. The paddy fields are dry. The young birds are also sufficiently grown to take care of themselves. This is the time when most of the heronry birds, that bred, leave the Sanctuary; and by November most of the birds are gone.

As the water in the river is much reduced by November the sheet rocks and boulders in the river are exposed and on these birds like the Great Stone Plover (*Esacus magnirostris*) and the Indian River Tern (*Sterna aurantia*) breed.

It is not known from where the heronry birds come to Ranganathittu for breeding and to where they go after breeding. To study this, ringing of the young was taken up in September 1975 with the help of the Bombay Natural History Society. Recovery reports are not yet reported.

Crocodiles and other animals. Marsh Crocodiles (*Crocodylus palustris*) also breed at Ranganathittu. They are often seen basking on the exposed sheet rocks in winter (November to February). Otters (*Lutra* sp.) are occasionally seen. Fruit Bats (*Pteropus giganteus*) roost in hundreds during day time on some of the larger trees along the bank of the river and on the main island where the heronry birds do not breed. Ranganathittu is also a Sanctuary for fish; and thirteen species are known to breed.

Tourism. The heronry attracts annually about a lakh of tourists. Boats and coracles are provided to take the visitors on the river for rowing round the islets to see the breeding birds. The money collected for entrance, boating, photography etc. from the visitors, forms a sizable revenue.

NOTES ON BREEDING BIRDS

OPENBILL STORK (*Anastomus oscitans*)

With the onset of premonsoon showers in May/June about 200 Openbills come for breeding at Ranganathittu. They nest almost exclusively on a lone, medium sized, *Terminalia arjuna* tree that stands in mid-river. Some Openbills also nest on low growing *Ficus glomerata*, *Pongamia glabra* and *Pandanus* plants that also stand in water. The *Terminalia arjuna* tree holds the main colony. Unoccupied spaces on the trees are utilised for nesting by some Egrets, Darters, Little Cormorants, Night Herons and Pond Herons (the last three species inside the foliage).

When the Openbills arrive in May/June their plumage is snow-white except the deep purplish (greenish tinged) remiges and charcoal black tail. Later as the season advances the snow-white coat changes gradually to light grey, which looks dirty. The change of colour from white coat to light-grey coat is so natural and gradual that one misses it. When the Openbills commence building nests, which is usually by the end of 3rd week or beginning of 4th week of June, all have snow-white coat. This white-coat continues throughout July, when about 50% of them will have laid eggs and others will be building nests. The birds start turning greyish as the incubation period advances and by the 3rd week of August about 50% of the birds would have become grey and the remaining 50% would be turning grey. A few may remain (ten seen in August 1977) in pure white plumage. By end of August all breeding birds would have turned light grey, by which time they will have chicks in the nest. One bird with white coat was seen as late as in the 1st week of September in 1977, when all others had turned light grey, but this had no nest. Again by

January onwards the greyish coat starts turning whitish; and this process of change of colour continues upto April, as seen from some birds remaining in the sanctuary.

The young from the nestling stage to sub-adult have light greyish colour. When the sub-adults become adults (in the next year) i.e., when the gap in their bills becomes prominent, they also commence putting on the white coat of maturity by late June.

In 1975 the Openbills were seen mating on 15-vi-1975 and commenced nesting on 21-vi-1975. Matings were seen upto 2-viii-1975.

Kahl (1970) has recorded for Bharatpur that the Openbills regurgitate a quantity of water over the eggs. This was not observed at Ranganathittu.

The Openbills normally raise only one brood at Ranganathittu. A few also raise a second brood, if their first clutch of eggs is pillaged by the macaques and crows. As these birds nest at a higher level i.e., well above the flood level, they are not affected by floods, which destroy the low built nests of other birds at this sanctuary. So most of the Openbills do not have the need to raise a second brood.

A few juveniles with undeveloped gap or just developing gap in their bills are seen to accompany adult Openbills, that come for breeding at Ranganathittu, at the beginning of the breeding season (such sub-adults, however, number hardly about 5 to 10 each year).

From the third week of August onwards chicks are seen and the parents make several sorties to feed the chicks. One of the pair always stands as a sentry over the chicks till the other partner returns with food. In August, September and October, when the days are hot, the parents, protect the young against the sun by providing shade with their half or fully spread wings. In some nests both the eggs and chicks are seen together, which fact explains



Left—Above: Openbills in their white nuptial coat, as they arrive for breeding. The one at the centre, by the side of White Ibis, is having grey coat. Below: White Ibises busily engaged in nesting on low bushes. Right—Above: A Spoonbill incubating at its nest on a *Pandanus* thicket. Below: Little Cormorants on a *Salix* plant.

(Photos: S. G. Neginhal)



Left—*Above*: A snake-bird incubating at its nest. Mark silvery-grey plumes on its back. *Below*: A Great Stone Plover exhibiting strange behaviour at the Mysore Zoo. It used to come and attack the cage keeper in this fashion. It was trying to protect its false egg — a roundish stone!

Right—*Above*: The chick of the Great Stone Plover swimming in the waters to go to the other rocks. *Below*: A River Tern descending on its nesting rock. The nestling at the right corner is calling at its parent.

(Photos: S. G. Naginhal)

the size-difference later seen in the fledglings in some cases (normally all the young ones in a nest are uniformly sized).

When boats carry visitors very near to the nesting trees, the parent birds move or fly away from their nests. The crows (both House and Jungle) at this moment rob the eggs and the young chicks. The parent birds, even if perching within a distance of one metre of their nests do not defend their nests in such circumstances. But if men clear out at once, the birds immediately rush back to their nests and scare away the crows. If in the mean time the crows have done damage to the eggs, the parent birds pick up such broken eggs in their bills and throw them out. I have also seen parent birds threatening the crows coming near their nests and protecting the nestlings by covering them with their slightly spread out wings, if men are not nearby in boats.

The Openbill fledglings stay in their nests and are dependent on their parents for a longer time than those of other species. The parents were seen to feed them at their nests, in some cases, as late as December-January long after other breeding birds had left the Sanctuary.

The fledglings spend most of their time in the nests unlike the fledglings of other species and over 70% of the fledglings are at their nests as late as November. From November onwards the parents are away most of the time of the day outside the sanctuary, leaving the young to spend time by themselves in the Sanctuary.

As soon as the parents land down at the nest (at times even earlier as the fledglings sight their parents in the sky) the fledglings stand in a semi-circle and commence squealing, and till the food is regurgitated on to the floor of the nest the fledglings keep on squealing and moaning. They half open their wings, raise the tail-

feathers and move the head up and down, pointing to and hitting with their bills on the floor of the nest. If the parent does not disgorge the food early, the young peck at the feet and bill of the parent and again hit the floor of the nest with their bill. The squealing continues till regurgitation takes place, on which the young feed noisily and greedily. The parent regurgitates food rapidly several times at the centre of the nest. Quite often, when the parents of adjoining nests land at their nests, the young first commence their routine squealing but later stop when they realise their mistake.

Once I saw a parent Openbill coming to its nest and feeding its three young ones by regurgitating. At this juncture a grown up fledgling came quite close to this bird. The parent Openbill immediately started jabbing at the intruding fledgling. A little later the fledgling again slowly and steadily approached the parent bird, submissively squealing and the parent this time kept quiet. This intruding fledgling might have been of the parent's earlier clutch (this is quite rare) or an orphan, which perhaps survives by getting food this way.

In some nests, if a second brood was being raised on account of damage to the earlier clutch by monkeys or by crows, a senior fledgling is often seen along with the younger brood of the second clutch. This senior fledgling on many occasions is pestered by the junior fledglings for food, which are seen collecting in a semi-circle around the senior fledgling and ceremoniously demanding food. If the senior has become a juvenile, it may even try to feed the younger fledglings of its nest, in the absence of its parents who are out foraging. In mid January 1976, I observed one sub-adult (without the development of the gap in the bill) Openbill bringing a small

round shelled mollusc in its bill to a nest. As soon as it landed on its nest another younger fledgling that was already in the nest started ceremoniously demanding food. The sub-adult that had brought the food obliged. It was also seen disgorging other food. Both the parents of this nest had gone out, when this happened.

The fledglings of one nest do not steal the food of the adjoining nests, but wait for their own parents to come and feed them.

The frequency of feeding of the young ones is much reduced from November onwards, and the fledglings are left to themselves most of the day. By January most of the fledglings leave their nests and spend time on the rocks in the river. Later they roost in the evening on river-side trees up-stream with adult Openbills and other species.

Initially, as the Openbills start breeding there is not much of intra-specific competition, but as more birds come the competition to occupy nesting sites sets in. In such circumstances the birds were observed fighting amongst themselves by jabbing and pecking at each other.

In October 1976 nests of three pairs of Openbills were seen on a bough of a tree, built very near to each other. All three nests had three nestlings in their nests and were covered by a parent bird in each nest. The parent bird in the middle nest was observed pecking at the bills of the parent birds standing in their respective nests, on either side whenever these two birds positioned themselves close to the middle nest.

Sometimes the Openbills suddenly erupt into quarrels amongst themselves for reasons best known to themselves. On one occasion, two Openbills, of one nest and two of an adjoining nest suddenly started jabbing at each

other without any apparent reason. Both nests had eggs.

The fledglings are also seen to defend their nests against the fledglings of adjoining nest if they inadvertently intrude.

EGRETS

Ranganathittu provides rare opportunities for studying the breeding behaviour of four Egrets namely *E. alba*, *E. intermedia*, *E. garzetta* and *Bubulcus ibis*. These birds offer an added charm to this heronry with their attractive breeding plumage. Together they form the majority of the breeding birds of this heronry. Amongst themselves *E. intermedia* and *E. garzetta* form the majority.

EASTERN LARGE EGRET (*Egretta alba*)

No detailed study has been done on the food habits of these birds at Ranganathittu. It is of interest to note that in September 1975, while ringing young ones of the breeding birds at Ranganathittu, a nestling of a Large Egret while being handled disgorged from its crop, seventy eight fish fry due to fright. Another nestling vomited some fish fry and a half digested small crab.

The birds put on two attractive nuptial costumes during the breeding season namely snow-white dorsal plumes and beautiful blue colour on the lores and orbital skin (Salim Ali 1968). These plumes are often kept erect and spread out during courtship and nidification periods. The intra- and inter-specific competition for acquiring and defending nesting sites also provoke these birds to spread out the plumes. The plumes adorn the birds right from their arrival in May/June to middle of August, when they will have nestlings. Later they disappear. The blue colour of the orbital skin does not last long. It is bright blue

in May/June and starts fading and reducing as soon as the birds have eggs by the middle or third week of July. By the time the birds have nestlings, the blue colour completely fades in the fourth week of July and disappears by the third week of August.

The birds do not segregate but nest in association with Openbill Storks, Median and Cattle Egrets, Night Herons, Paddy birds and Darters. They prefer the low *Pandanus* thickets to the tall trees for nesting.

Mating is seen in the months of May/June as soon as they come for breeding.

In July 1976, I saw a Large Egret, with blue coloured lores, attempting to mount a Median Egret, with Yellowish-orange coloured lores. The latter obliged without protesting and the male Large Egret had mounted the female Median Egret, but before the copulation could take place another Large Egret with the blue lores came and drove away the mounting Large Egret. This incident suggests the possibility of occurrence of inter-species mating between Large and Median Egrets.

Both sexes take part in incubation. One of the parents is always at the nest when they have eggs or nestlings. The nestlings soon grow into fledglings, and when they are large enough to be beyond predation both the parents were observed going out for foraging. While the parents are away the fledglings leave their nests and take shelter in the foliage of the nesting plants till their parents return to feed them. When the days are hot (34-35°C.) the parents shield their nestlings against the sun by providing shade with their half open wings.

Whenever troops of macaques raided the Large Egrets were seen squealing and protesting and even jabbing at the monkeys. Once after the monkeys had left a *Pandanus* thicket after pillaging the nests, a Large Egret was

seen returning to its nest and picking and throwing into the river its damaged eggs.

SMALLER OR MEDIAN EGRET *Egretta intermedia*

Birds with both black iris with a white ring and birds with reddish iris without the white ring were seen. Whether these characters indicate sex difference needs to be studied.

The Median Egrets develop attractive Yellowish-orange colour on the orbital skin and on the lores during the breeding season. The birds have this bright nuptial colour from May/June to end of July. As the birds lay eggs the yellowish-orange colour on the lores starts fading and reducing in area. By the time they start having chicks a much faded yellowish colour remains on the skin around their eyes, and by end of August the colour completely disappears. Unlike the Large Egrets, the Median Egrets develop nuptial plumes both on the back and on the breast, the latter being shorter. The nuptial plumes are often kept erect to look like "Misty-showers". The birds have the plumes from the fourth week of April to end of August, when they normally have chicks in the nest.

These birds nest gregariously in association with the Little Egrets, almost at ground level, on the low thorny tangles of *Caesalpinia bonducella* growing on the "Rain-tree island". Some of these birds also nest in a scattered way on small trees and on *Pandanus* thickets in association with other birds.

It is of interest to note that these birds (Little Egrets too) collect the floating grass, straw, tiny twigs and sticks, that come down the river in the floods, for constructing the nests, in addition to the nesting material that they bring from outside. They fly low over the water and pick up the floating and drifting nesting material with their bills.

Initially when these birds arrive for breed-

ing, the heronry resounds to their croaking sounds while they jealously defend their nesting places.

When the Bonnet monkeys raid the islets the Median Egrets jab and lunge at the monkeys, keeping erect their plumes. They go on squealing and croaking till the intruders vacate the islets. On one occasion four Median Egrets were observed unitedly jabbing at a raiding macaque.

LITTLE EGRET *Egretta garzetta*

Little Egrets come in more numbers to breed at Ranganathittu than the other Egrets. They have yellow feet as a rule, but a few have pink feet also.

Two long nuchal plumes (nuptial plumes) adorn these birds from about third week of April to end of August, by which time they have chicks. The orbital skin also gets light greenish yellow in colour, which is not so prominent as that of the breeding Large and Median Egrets. (Birds with pink feet develop pink colour on the orbital skin.)

These Egrets nest gregariously on the low *Caesalpinia bonducella* tangles, on "Rain-tree islet" in association with the Median Egrets. Some also nest among other birds. The Little Egrets also collect the floating and drifting nesting materials.

Little Egrets are comparatively more aggressive than the other Egrets. They were observed vociferously acquiring and defending their roosting and nesting territories.

As already stated a few Little Egrets (3-4 pairs) with pink feet and pink lores and pink orbital skin were observed coming to Ranganathittu for breeding. They bred separately — not mixing with the normal Little Egrets with yellow feet. They have two long nuchal plumes also, and shed these after the breeding is over.

CATTLE EGRET *Bubulcus ibis*

The birds start turning golden buff (their nuptial costume) by early or middle of March. The buff colour first covers the face and neck and then slowly spreads on the back and breast. After the peak of the breeding season is over, the bright buff coat starts fading. By first week of October, when the birds have fledglings, these become almost white; and by end of October the birds turn snow-white again.

By the second week of June the birds commence nesting. They do not nest gregariously but in association with other Egrets, Night and Pond Herons. The Cattle Egrets very jealously guard their nests.

WHITE IBIS *Threskiornis melanocephala*

The white ibis nest gregariously on low vegetation. Such of the birds that come late in the breeding season even nest in communes on the bare ground of "Rain-Tree islet." This was observed in 1973 and 1975 when a large number of white ibises came for breeding. They nested gregariously on the ground using a bare minimum of twigs and some had laid eggs on the ground without even forming nests!

Most of the hatchlings are seen in August. The hatchlings grow remarkably fast into fairly large sized nestlings within a week. When hardly one month old, they start crawling about and get mixed up with the young ones of adjoining nests of their kind.

In October the grown up juveniles are seen flying around and spending their time in groups on the exposed sheet rocks of the river, feeding by themselves on titbits till their parents come and feed them.

SPOONBILL *Platalea leucorodia*

Only 6 to 7 pairs come to Ranganathittu for breeding. Their number has remained re-

markedly constant through out these years.

These birds come quite late in the season and seem to be exacting in their requirement of breeding conditions. Unless favourable conditions are available, they do not take up nesting and may even skip a year without breeding, if proper conditions are not available. This happened in 1976, when five pairs of spoonbills were seen but none nested. Floods seem to have some bearing on breeding of these birds at Ranganathittu. Initially on arrival they are seen spending their time by standing and dozing on the rocks and plants. As soon as the river is in spate they spring into action and commence nesting.

Spoonbills have a favourite nesting place at Ranganathittu, where they nest on low growing shrubbery, at a corner of 'Rain-tree' island, segregating into their own colony, with no other birds nesting nearby. But this traditional place was temporarily abandoned in 1975, when the unusual floods washed away their nests and eggs.

CORMORANTS *Phalacrocorax* sp.

Three Species of Cormorants come to Ranganathittu. Large Cormorant (*Phalacrocorax carbo*); Indian Shag (*Phalacrocorax fuscicollis*); Little Cormorant (*Phalacrocorax niger*).

Little Cormorants in hundreds come and roost at Ranganathittu, but only about fifty pairs breed here in the season. Large Cormorants and the Indian Shag irregularly breed. In the years 1972 and 1973 only 2-3 pairs of Large Cormorants nested and although a few pairs came from 1974 to 1977 they did not nest. The Indian Shags also irregularly nest. Between the years 1972 and 1977 the Indian Shag nested (six pairs) only in 1976, which was surprisingly a drought year, when monsoons failed and the river did not flood.

Little Cormorants commence nesting earlier

than the other two Cormorants in June/July. The Large Cormorants and the Shags nest later in August/September. Little Cormorants nest on medium sized trees in association with Darters, Egrets, Openbill Storks etc.

The Indian Shag has a tendency to segregate and is found nesting on the *Salix* on 'Salix' islet, on which the Darters also nest. The Large Cormorants build their nests on the lone large-sized Rain-tree (*Pithecolobium saman*) on Rain-tree islet. In addition to bringing nesting materials from the round about areas, the Little Cormorants were also observed collecting nesting materials that come drifting down the river.

DARTER OR SNAKE-BIRD *Anhinga rufa*

The Darter prefers the low growing *Salix* trees for nesting. They nest gregariously. Some birds also nest in association with other birds. These (Night and pond Herons also) commence nesting earlier than other birds. By middle of April they are seen thumping down the vegetation to make their tops flat to begin the nesting and within a week their nests would be almost half ready. Nidification may be postponed to May or June depending on monsoon conditions. At the time of nesting, and even a little earlier, these birds become noisy, and call repeatedly with a "Keke-Ko, Keke-Ko". They also keep erect their nuptial silvery-grey plumes on their back while defending their nesting sites and nests. They are more vociferous in April/May; and in later months they become almost silent. By middle of May they are seen incubating in their nests with their long necks and tails projecting outside their nests.

Both sexes take part in nest building and other activities. The birds also collect floating twigs for nesting (in addition to fetching

material from outside). The snow-white nestlings turn grey as they grow into fledglings.

NIGHT HERON *Nycticorax nycticorax*

These crepuscular birds become conspicuously diurnal during the breeding season. The Night Herons are seen sitting and suspiciously staring at the intruders with their large blood red eyes, their general coloration so naturally blending with the vegetation that, unless they fly, they are not easily sighted. The birds which are silent during the day, become noisy at dusk; and commence flying noisily about giving out a harsh "Kwack, Kwack" call. Night Herons are seen foraging in the freshly transplanted paddy fields. While ringing, a fledgling disgorged quite a big fish, remarkable for the fledgling's small size. These birds (and Little and Cattle Egrets also) are at times seen around Crocodiles that bask on the rocks, perhaps to feed on the ectoparasites.

The two long nuptial plumes (nuchal) are kept erect during various competitive and aggressive activities of the breeding birds. Although nidification activities are mostly seen in the afternoons, the birds are sometimes observed carrying nesting twigs even during the mid day. The birds vehemently defend their nesting sites against other birds. They prefer *Pandanus* breaks for nesting, and nest gregariously in association with other birds. Though some birds are seen with eggs as early as the third week of March, the birds generally commence nesting in April/May.

The Night Herons defend their nests against Crows and Bonnet Monkeys by fluffing out their feathers, raising their crest feathers and jabbing. They squeal and protest till the monkeys move away from their nests.

These birds do not easily give up their drowning nests during floods. They sit tightly

on their nests, till the rising waters forcefully drag away the nests. During floods I saw many of these birds sitting tightly on their nests, which were lifted off by the rising waters and were being carried away down stream. The Night Herons floated down the river sitting on their nests and only when their nests disintegrated did they fly off.

INDIAN POND HERON OR PADDY BIRD

Ardeola grayii

The Pond Heron has an attractive bluish colour to its orbital skin and looks handsome with its changed nuptial colour of dark reddish colour during the breeding season.

Pond Herons favour *Pandanus* thickets for nesting. They repair the previous-season's nests for breeding in addition to building new ones. They nest in loose association with Night Herons and Egrets, and occupy the lower and interior portions of the vegetation (like the Night Herons) for nesting.

EASTERN PURPLE HERON *Ardea purpurea*

These are very shy birds, and at the sight of man, even from a distance they fly away inconspicuously without making any sound. Only in 1977 did I spot the Purple Heron breeding a little distance upstream from the main islets on which other birds normally bred. It was a chance discovery. The Purple Herons gregariously nest in exclusive colonies, on *Pandanus* thickets that stand in the river. The birds nest on the top of the *Pandanus* after flattening the leaves. The nests are markedly small in size compared to the birds' large size. The light blue eggs are quite big. I have observed these birds incubating from January to June.

As one goes in the boat to the nesting colony of Purple Herons, the birds leave their nests unprotected and go and perch on nearby

trees, watching the intruders. However when crows come to take advantage of this situation to rob the nests, the Purple Herons immediately return to their nests to protect their nests, if the men in the boat are reasonably away or prudently withdraw. While returning to protect their nests, the birds give out a peculiar protesting harsh 'honks' with the plumes on their crest (nuptial) raised. They jab at the crows and drive them away.

GREAT STONE PLOVER *Esacus magnirostris*

Great Stone Plovers commence breeding at Ranganathittu after the breeding season of the heronry birds is over. As the river recedes, (soon after the monsoons are over) these birds appear on the exposed sheet rocks, on which they breed. They are often seen during the day dozing and drowsing on the rocks, surrounded by water. If men in boats go towards them, they fly giving out agitated and quick "Kill-ick, Kill-ick, Kill-ick" calls in quick succession.

One to two eggs (two common) are laid on the bare sheet rocks surrounded by deep water, in the middle of the river. Sometimes eggs are laid at the base of short grasses growing on the rocks. The eggs are at times seen surrounded by dry fallen leaves of nearby shrubbery. The nests cannot be easily traced out although in the open, the camouflage being so perfect. As the incubation advances the eggs become smudged and covered with red and white coloured excreta. This makes the surroundings so natural that the eggs are not easily spotted by nest-robbers.

I have seen these birds with eggs in all the months from November to March. While one of the parents is incubating, the other is usually found nearby squatting and dozing. The birds are very timid and wary. On near approach the incubating birds get up and

start running from one end of the rock to the other calling with a deep whistling note and keeping watch over the intruder's movements. Ultimately they fly away taking a long semi-circle, but keep watch on the intruder from a distant rock. If a crow tries to take advantage of the situation, the birds immediately return to their nests to protect the eggs (if we clear out in the meantime). The nesting River Terns (*Sterna aurantia*) in the vicinity offer added indirect protection to the nests of these birds, as the River Terns vehemently drive away any intruder coming in the neighbourhood of their nests. Once a pair of River Terns were seen attacking even a nearby Great Stone Plover which was incubating in its nest. The Stone Plover fanned out its tail and ducked several times to avoid the attack of the River Terns.

Sálim Ali (1969) states that the incubation period of the Great Stone Plover has remained undetermined. However from my field observations I deduce the incubation period of the birds to be 28 days.

While I was the Curator, Mysore Zoo a Great Stone Plover had laid an egg on 28-1-1978, which hatched on 26-2-78. So the incubation period at the Zoo was also 28 days.

Even one day old chicks are marvellously active. They run about quite fast on the rocks. They can also swim quite swiftly and easily and go from one rock to the other, when followed. They lie doggo either floating in water or on the rocks with their eyes wide open, watching the activities of the intruders. Their colour so perfectly camouflages that hours of searching may be futile, even when the nestlings are quite close by. As the boats go near the nesting rocks the parents give a cautioning deep whistling and the nestlings freeze. A nestling was observed lying doggo for full two hours. Once a one day old chick